



**16HA-861
16HA-860
15H-860**

PORTABLE AM/FM/SW FULL-BAND RADIO

SERVICE MANUAL

SPECIFICATIONS

Frequency Range	FM 87.5 — 108 MHz LW 150 — 350 KHz MW 515 — 1620 KHz SW1 2.3 — 5.2 MHz SW2 5.95 — 7.3 MHz SW3 9.5 — 12.5 MHz SW4 14.5 — 18.0 MHz
Intermediate Frequency	FM 10.7 MHz AM 455 KHz
Sensitivity (for 50mW output)	FM 5 μ V (30dB S/N) LW 50 μ V/m MW 25 μ V/m SW1 30 μ V/m SW2 20 μ V/m SW3 20 μ V/m SW4 3.2 μ V
Power Output	Undistorted 1.4W Maximum 2.0W
Power Supply	DC 9V, Six 1.5V "D" Batteries AC, 110V/220V for model 16HA-861 and 16HA-860
Current Drain	No Signal 40 mA Maximum 380 mA
Speaker	4" x 6" permanent dynamic type 4 ohm voice coil impedance
Dimensions	14½" wide x 8" high x 4¾" deep
Net Weight	7½ lbs.

This Manual contains information compiled from basic engineering data of model 16HA-861. Some minor changes or modifications different from contents in this manual may be found in units of latest production.

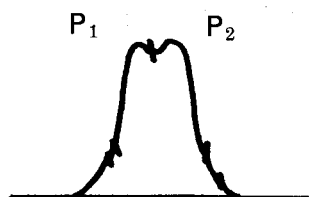
SANYO ELECTRIC CO., LTD.

ALIGNMENT PROCEDURES

Band Coverage & Tracking Alignment

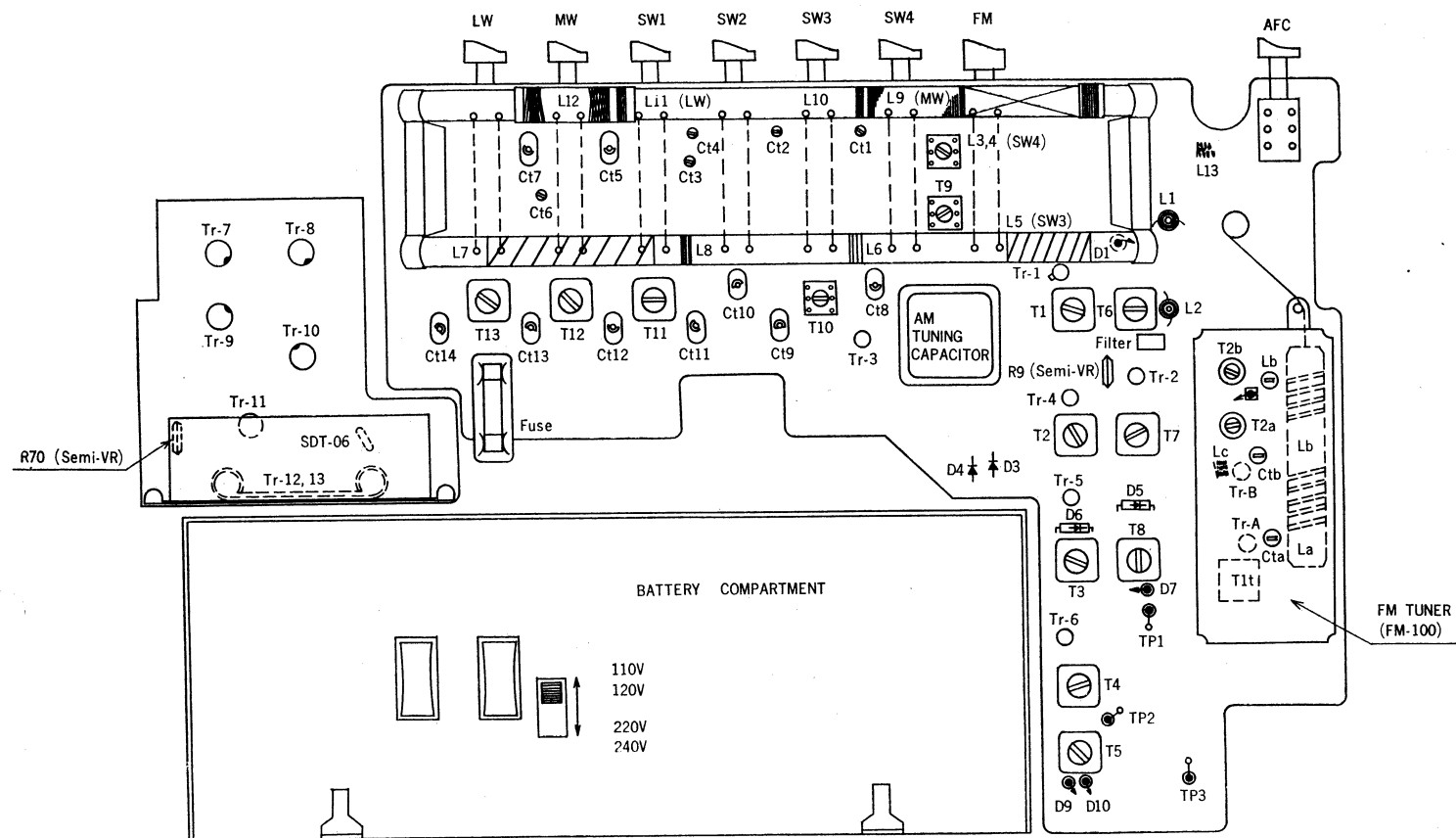
Procedures	Position of Band Switch	Signal Input	Frequency of Signal Gen.	Dial Setting of Radio	Components to be Adjusted
FM IF STAGE	FM	Dummy Ant	10.7 MC	87 MC	FM IF Transformers T4, T3, T2, T1, T2a & T2b
FM DISCRIM.	FM	Dummy Ant	10.7 MC	87 MC	FM IF Transformer T5
FM BAND COVERAGE	FM	Dummy Ant	89 MC	89 MC	Oscillator Trimmer Ctb
	FM	Dummy Ant	106 MC	106 MC	FM Oscillator Coil Lb
FM TRACKING	FM	Dummy Ant	98 MC	98 MC	FM RF Trimmer Cta
AM IF STAGE	SW1	Thru 0.1 μ F	455 KC	Lowest End	AM IF Transformer T8 T7 & T6
MW BAND COVERAGE	MW	IRE Loop	505 KC	Lowest End	MW Oscillator Coil T12
	MW	IRE Loop	1650 KC	Highest End	MW Oscillator Trimmer Ct13
MW TRACKING	MW	IRE Loop	600 KC	600 KC	MW Antenna Coil L9 L10
	MW	IRE Loop	1400 KC	1400 KC	MW Antenna Trimmer Ct6
LW BAND COVERAGE	LW	IRE Loop	145 KC	Lowest End	LW Oscillator Coil T13
	LW	IRE Loop	365 KC	Highest End	LW Oscillator Trimmer Ct14
LW TRACKING	LW	IRE Loop	160 KC	160 KC	LW Antenna Coil L11 L12
	LW	IRE Loop	340 KC	340 KC	LW Antenna Trimmer Ct7
SW1 BAND COVERAGE	SW1	IRE Loop	2.23 MC	Lowest End	SW1 Oscillator Coil T11
	SW1	IRE Loop	5.2 MC	Highest End	SW1 Oscillator Trimmer Ct12
SW1 TRACKING	SW1	IRE Loop	2.4 MC	2.4 MC	SW1 Antenna Coil L7 L8
	SW1	IRE Loop	4.7 MC	4.7 MC	SW1 Antenna Trimmer Ct5
SW2 BAND COVERAGE	SW2	IRE Loop	5.95 MC	5.95 MC	SW2 Oscillator Trimmer Ct10
	SW2	IRE Loop	7.0 MC	7.0 MC	SW2 Oscillator Trimmer Ct11
SW2 TRACKING	SW2	IRE Loop	5.95 MC	5.95 MC	SW2 Antenna Trimmer Ct3
	SW2	IRE Loop	7.0 MC	7.0 MC	SW2 Antenna Trimmer Ct4
SW3 BAND COVERAGE	SW3	IRE Loop	9.30 MC	Lowest End	SW3 Oscillator Coil T10
	SW3	IRE Loop	12.4 MC	Highest End	SW3 Oscillator Trimmer Ct9
SW3 TRACKING	SW3	IRE Loop	9.7 MC	9.7 MC	SW3 Antenna Coil L5 L6
	SW3	IRE Loop	11.7 MC	11.7 MC	SW3 Antenna Trimmer Ct2
SW4 BAND COVERAGE	SW4	Dummy Ant	14.9 MC	Lowest End	SW4 Oscillator Coil T9
	SW4	Dummy Ant	18.2 MC	Highest End	SW4 Oscillator Trimmer Ct8
SW4 TRACKING	SW4	Dummy Ant	15.5 MC	15.5 MC	SW4 Antenna Coil L3 L4
	SW4	Dummy Ant	17.7 MC	17.7 MC	SW4 Antenna Trimmer Ct1

- NOTE:**
1. Repeat OSC and RF adjustments in each Band until no further improvement is noted.
 2. Align SW2 before SW3, as any coil adjustment on SW2 will effect the adjustments on SW3.
 3. Adjust R9 (50K) semi-fixed resistor for 1.5 ma Collector current, Tr2. Use an ammeter with no less than 1000K series resistor.
 4. Never short the base of Tr2 to ground (B+) or the base of Tr11 to common (B-), to prevent damage to these transistors. Extreme care should be taken during service or alignment of this receiver to insure these shorts not be made inadvertently by a screw driver or other test equipment.
 5. R9 and R70 are both 50K ohm variable resistors. Neither of these should be set below 10K ohms whenever receiver is on, but if repair must be made to either, preset to mid range before turning receiver on.
 6. Note that FM oscillator adjustments are made contrary to normal procedure. The high end is adjusted with the coil and the low end is adjusted with the trimmer capacitor, since the tuning variables are the coils.
 7. The AM IF response curve is double peaked. If alignment is made with a sweep generator and oscilloscope adjust the IF transformers for maximum response and minimum valley. The 455KHz marker does not necessarily fall directly in the center of the response curve. A ceramic filter is used which determines the two peaks of this response curve.



RESPONSE CURVE OF AM IF STAGE

MAIN CHASSIS LAYOUT



BLOCK DIAGRAM

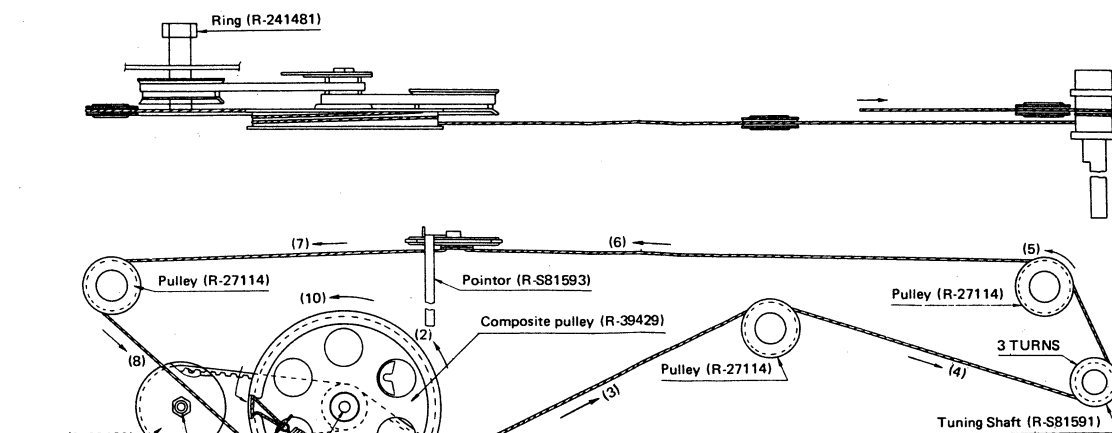
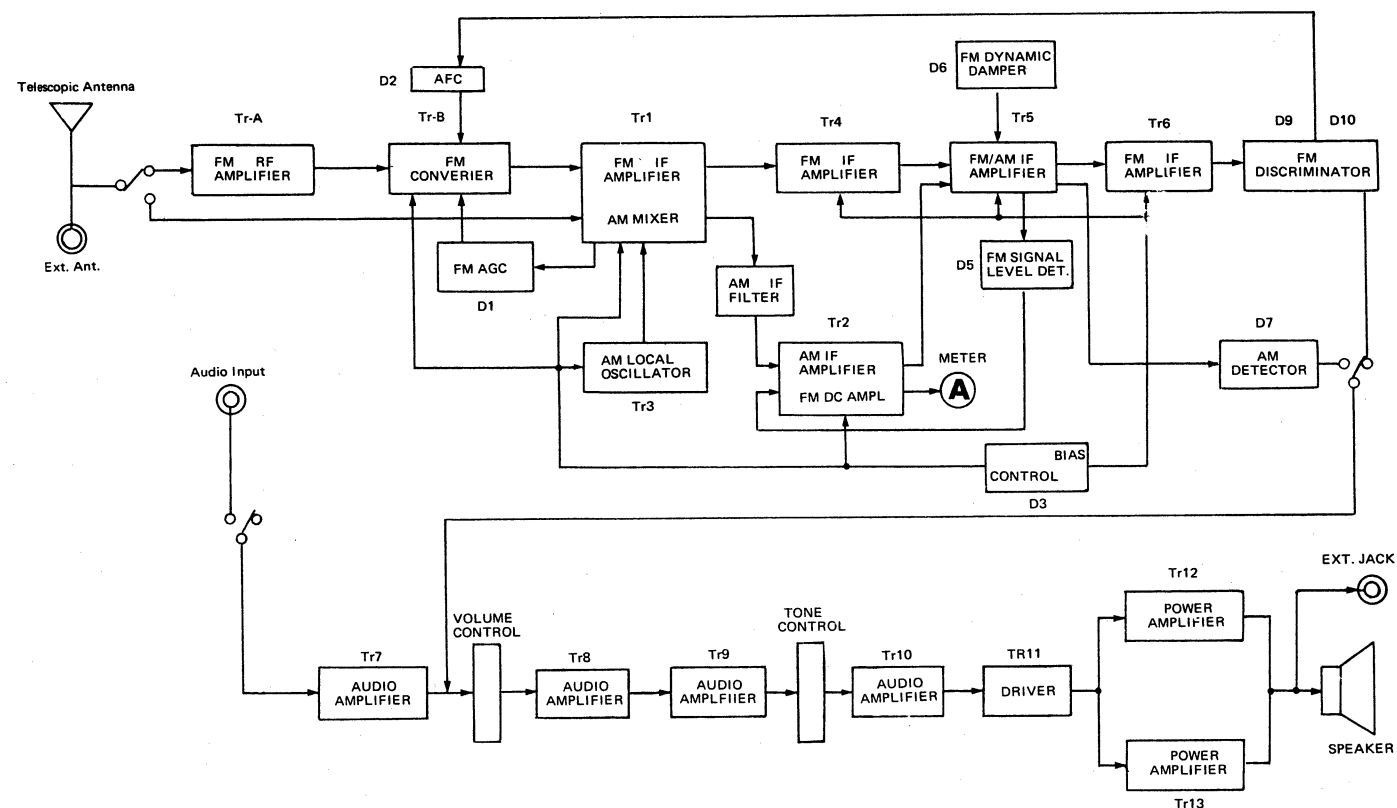


Fig. 1

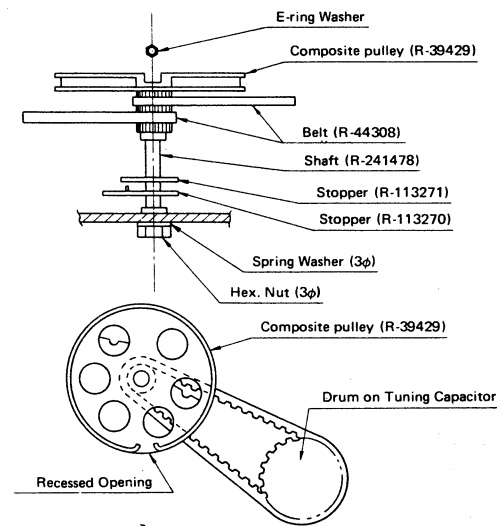


Fig. 2

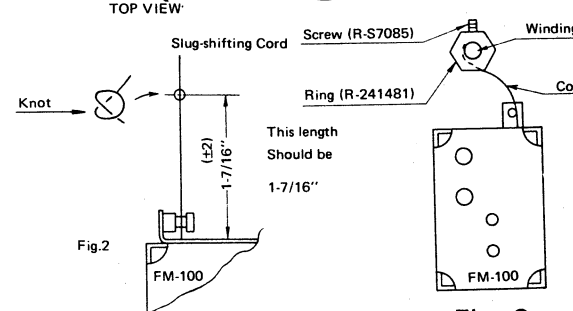


Fig. 3

INSTRUCTION FOR DIAL CORD STRINGING

- Mount Shaft (R-241478) onto chassis with Spring Washer (3φ) and Hex. Nut (3φ). Apply any lubricant onto the surface of it. Place Stopper (R-113270) and Stopper (R-113271) through Shaft, then mount Composite Pulley (R-39429) with two Belts (R-44308) attached in such a position as it's recessed opening faces downward as shown in Fig. 1 when Stoppers are hindered from swinging further by a projection on chassis.
- Mount two Drums (R-39430) temporarily onto Winding Shaft (R-S81598) and Tuning Capacitor respectively.
- One-Belt is conjugated with Drum on Tuning Capacitor in the state in which Tuning Capacitor has the minimum capacitance (been fully rotated clockwise). The other Belt is connected with Drum on Winding Shaft ordinarily without any special consideration. Then rotate Composite Pulley a full turn and check if Stopper works well without any play or not, as well as whether belt looping is correctly made with appropriate tension or not.
- Mount two Guides (R-113272) onto respective Drums with the specified screws. Be careful not to apply any notable forces onto Tuning Capacitor when fastening.
- String Dial Cord following the above illustration and locate Pointor (R-S81593) on Cord temporarily. Then place the unit into Housing and check the location of Pointor. If correctly located, fix Pointor with lacquer.
- COUPLIGN BETWEEN FM TUNER AND WINDING SHAFT**
Set Pointor to 106MC on dial scale of FM band (Pointor Just behind the "O" letter of 106). Pull out the slug-shifting cord (for "mu" variation of coils) from FM Tuner (FM-100) fully. Mark the point on the cord which is of 37 ± 2 millimeters distance measured from the metal casing. And make a knot on the marked point. (Fig. 2) Insert the cord through hole of Ring (R-241481) and tighten Screw (R-S7085) slightly. Apply FM signal of 106MC into input terminals (1 and 4) of FM-100 and adjust location of Ring on Winding Shaft in order to receive the signal loudest. Then fasten Ring with Screw tightened. (Fig. 3)

DIAL CORD STRINGING

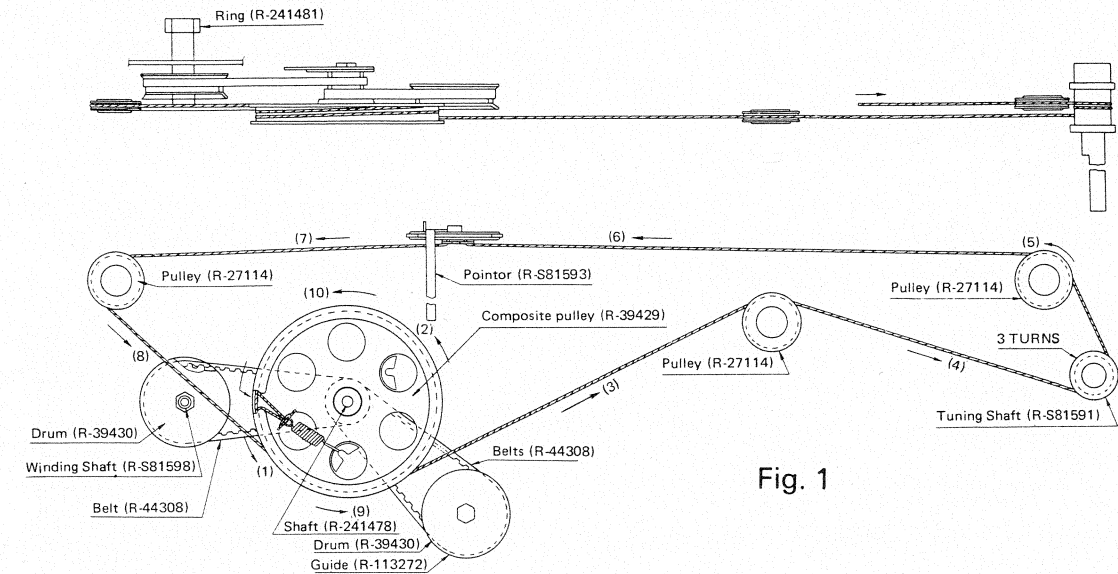


Fig. 1

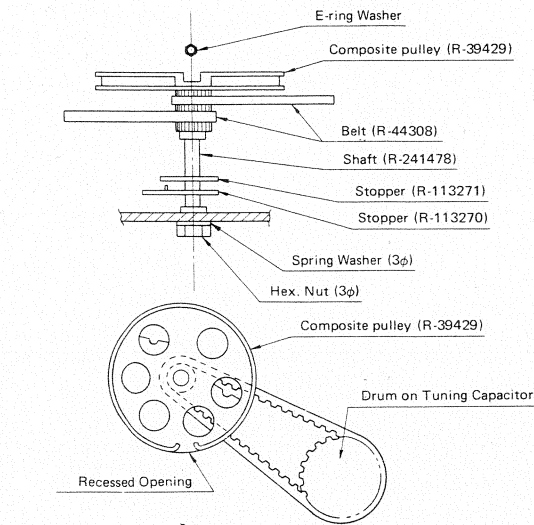


Fig. 2

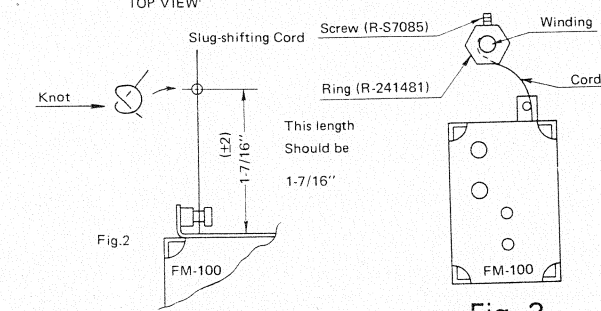
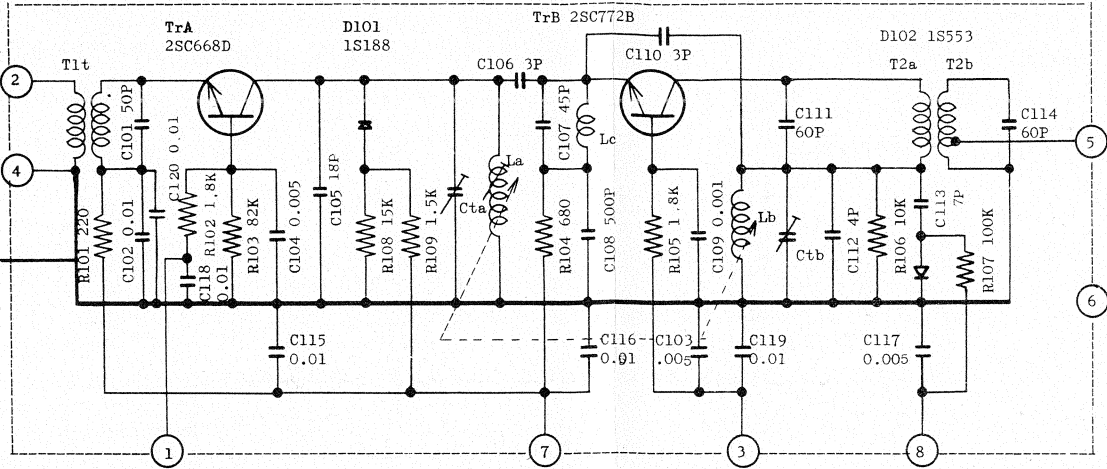


Fig. 3

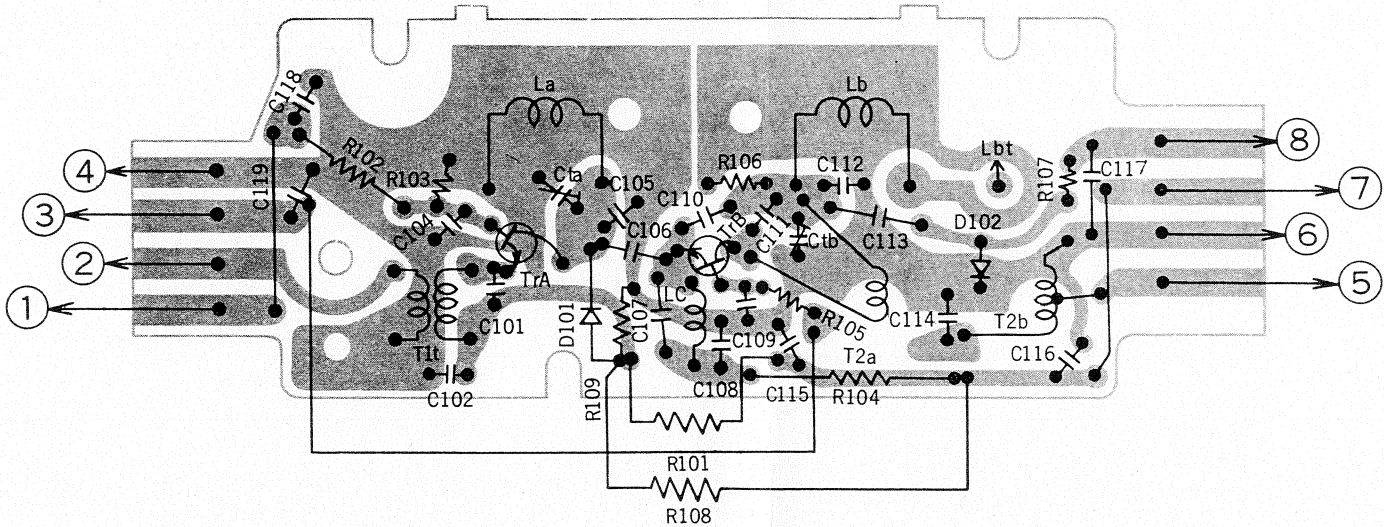
INSTRUCTION FOR DIAL CORD STRINGING

- a) Mount Shaft (R-241478) onto chassis with Spring Washer (3φ) and Hex. Nut (3φ). Apply any lubricant onto the surface of it. Place Stopper (R-113270) and Stopper (R-113271) through Shaft, then mount Composite Pulley (R-39429) with two Belts (R-44308) attached in such a position as it's recessed opening faces downward as shown in Fig. 1 when Stoppers are hindered from swinging further by a projection on chassis.
- b) Mount two Drums (R-39430) temporarily onto Winding Shaft (R-S81598) and Tuning Capacitor respectively.
- c) One-Belt is conjugated with Drum on Tuning Capacitor in the state in which Tuning Capacitor has the minimum capacitances (been fully rotated clockwise). The other Belt is connected with Drum on Winding Shaft ordinarily without any special consideration. Then rotate Composite Pulley a full turn and check if Stopper works well without any play or not, as well as whether belt looping is correctly made with appropriate tension or not.
- d) Mount two Guides (R-113272) onto respective Drums with the specified screws. Be careful not to apply any notable forces onto Tuning Capacitor when fastening.
- e) String Dial Cord following the above illustration and locate Pointer (R-S81593) on Cord temporarily. Then place the unit into Housing and check the location of Pointer. If correctly located, fix Pointer with lacquer.
- f) COUPLIGN BETWEEN FM TUNER AND WINDING SHAFT
Set Pointer to 106MC on dial scale of FM band (Pointer Just behind the "O" letter of 106). Pull out the slug-shifting cord (for "mu" variation of coils) from FM Tuner (FM-100) fully. Mark the point on the cord which is of 37 ±2 millimeters distance measured from the metal casing. And make a knot on the marked point. (Fig. 2) Insert the cord through hole of Ring (R-241481) and tighten Screw (R-S7085) slightly. Apply FM signal of 106MC into input terminals (1 and 4) of FM-100 and adjust location of Ring on Winding Shaft in order to receive the signal loudest. Then fasten Ring with Screw tightened. (Fig. 3)

FM TUNER (FM-100)
SCHEMATIC DIAGRAM



INTER-PARTS WIRING ILLUSTRATION

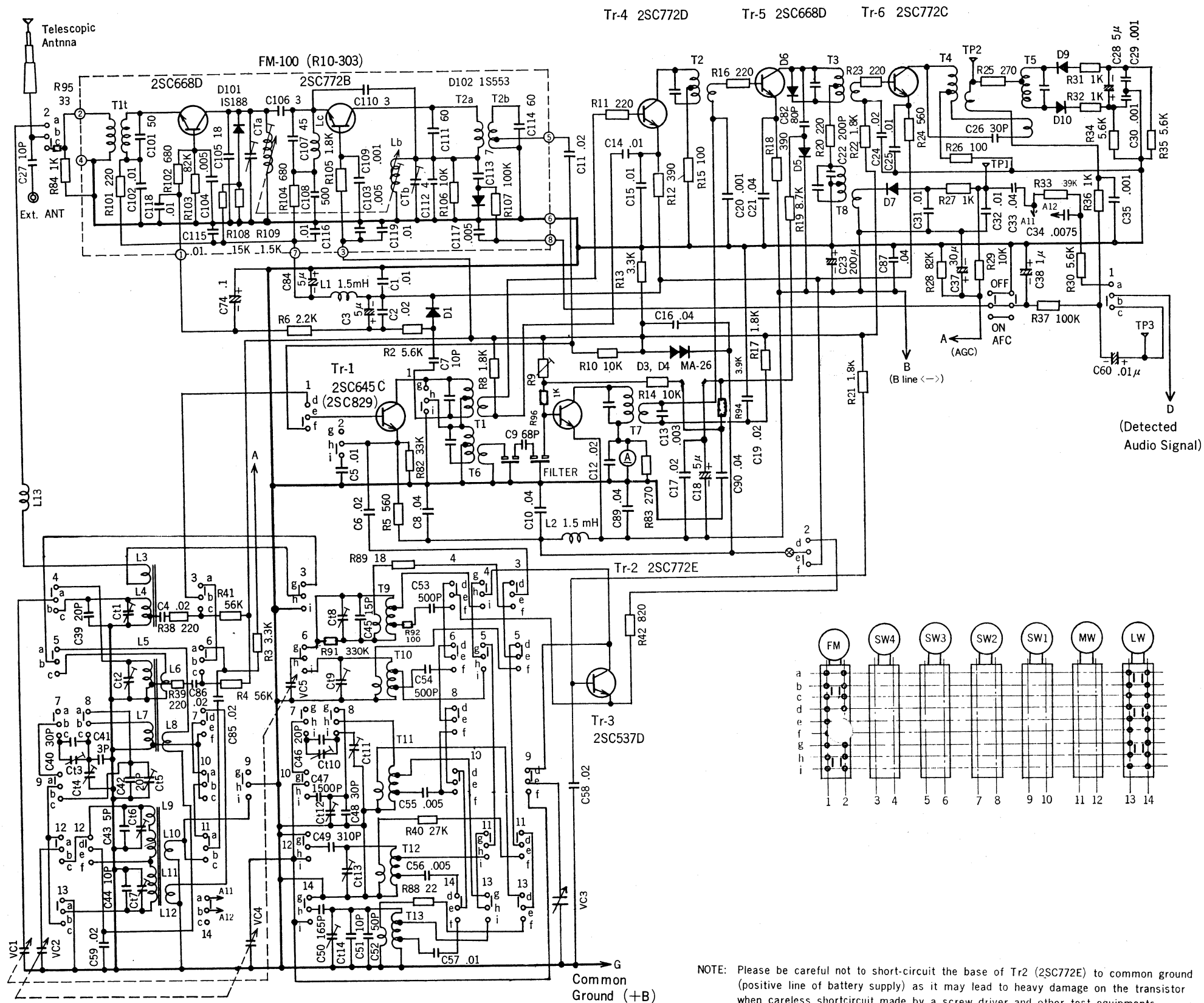


COMPONENT PARTS

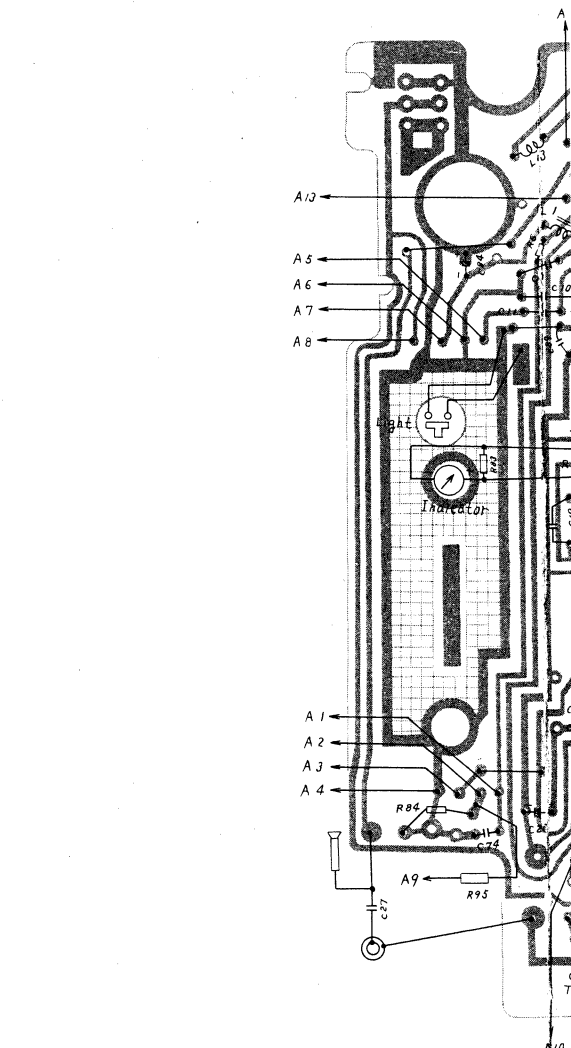
Schematic Location	Part No.	Description	Schematic Location	Part No.	Description
FIXED VALUE CAPACITOR					
La Lb	R-113353a	Shield Case	C101	R-CKD500K	Ceramic 50pF ±10%
	R-113354d	Bottom Casing	C102 C115	R-CKD103Z	Ceramic 0.01μF +80%
	R-113355a	Metal Mount - guide mtg	C116 C118		
	R-241522	Guide Shaft	C119		
	R-241523	Guide	C103 C104	R-CKD502Z	Ceramic 0.005μF +80%
	R-S81668	Variable Inductance Coil Assembly	C117		
	R-S81679	Ferrite Slug	C105	R-CKD180K	Ceramic 18pF ±10%
	R-35314	Bobbin	C106 C110	R-CKD030J	Ceramic 3pF ±0.25pF
	R-35315	Stopper	C107	R-CKD450K	Ceramic 45pF ±10%
	R-15330	Tension Spring	C108	R-CKD501M	Ceramic 500pF ±20%
T1t Lc T2a T2b Cta Ctb	R-	Special Head Machine Screw 3x6	C109	R-CKD102M	Ceramic 0.001μF ±20%
	R-W2365	Antenna Coil	C111 C114	R-CKD600K	Ceramic 60pF ±10%
	R-W1069	Choke Coil 0.6uH 16 turns	C112	R-CKD040K	Ceramic 4pF ±0.5pF
	R-W5W032	IF Transformer	C113	R-CKD070K	Ceramic 7pF ±0.5pF
	R-C0064	Cylinder Trimmer	FIXED VALUE RESISTORS		
	2SC668D	Transistor	R101	R-R221J	220 ohms ±5% 1/4W
	2SC772B	Transistor	R102	R-R681K	680 ohms ±10% 1/4W
	D101	Diode (for FM use)	R103	R-R823J	82K ohms ±5% 1/4W
	D102	Diode (variable capacitance)	R104	R-R681J	680 ohms ±5% 1/4W
		Printed Circuit Board	R105	R-R182K	1.8K ohms ±10% 1/4W
			R106	R-R103K	10K ohms ±10% 1/4W
			R107	R-R104K	100K ohms ±10% 1/4W
			R108	R-R153K	15K ohms ±10% 1/4W
			R109	R-R152K	1.5K ohms ±10% 1/4W

SCHEMATIC DIAGRAM (RF and IF Stages)

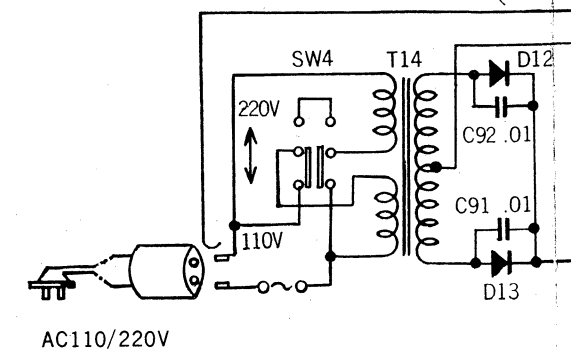
INTER-PARTS WIRING ILLUSTRATION (RF and IF Stages)



NOTE.
All resistance values in "ohms" K=1,000 ohms.
All capacitance values in " μ F" P=pF.

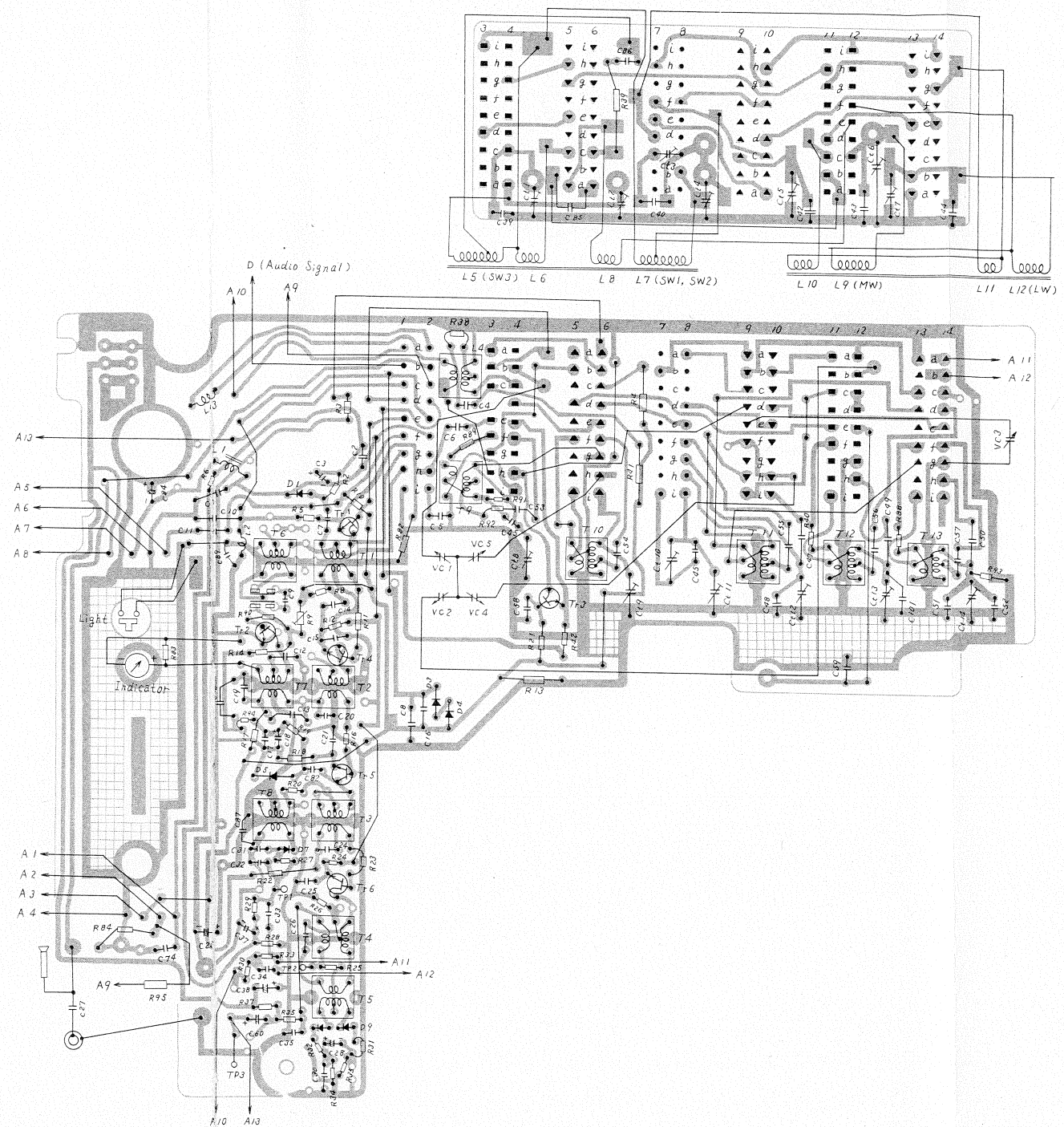
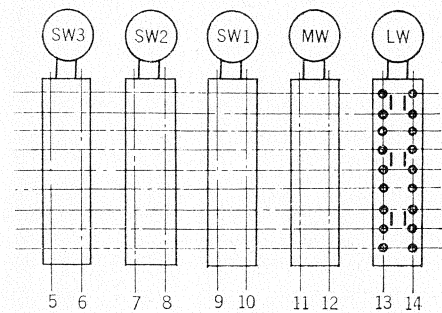
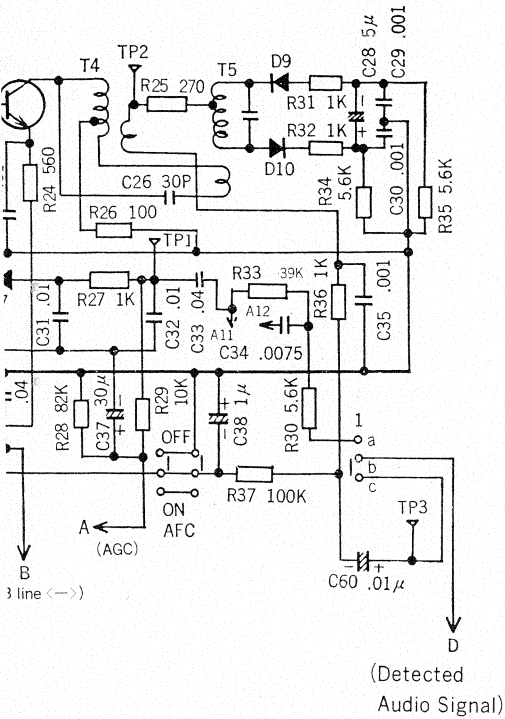


AC CONVERTER (16 HA-861 & 16 HA-860).



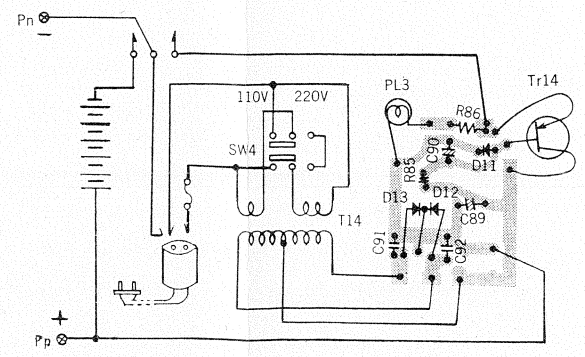
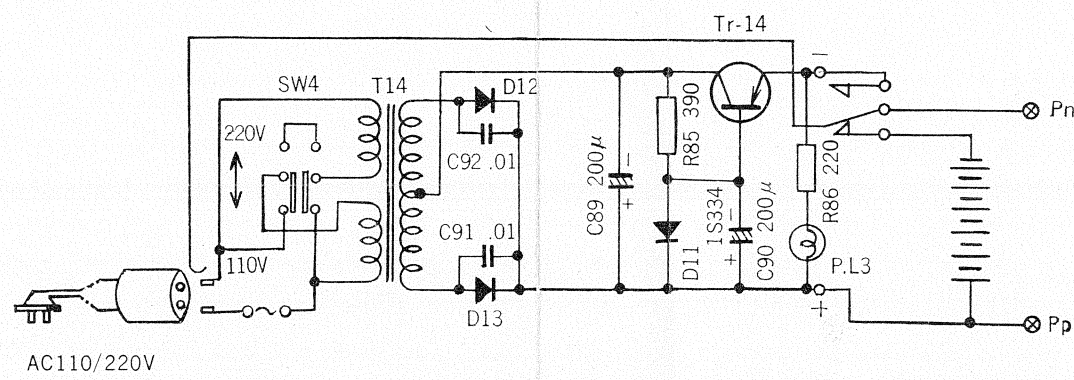
INTER-PARTS WIRING ILLUSTRATION
(RF and IF Stages)

2SC772C

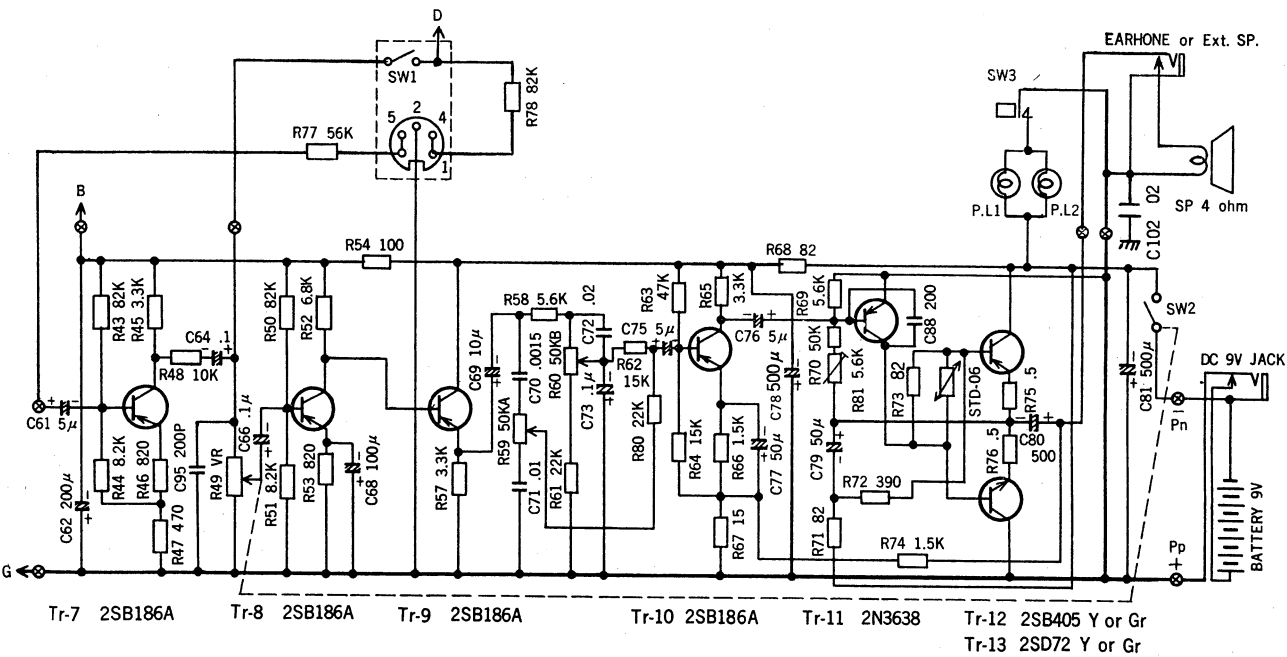


AC CONVERTER (16 HA-861 & 16 HA-860)

ircuit the base of Tr2 (2SC772E) to common ground as it may lead to heavy damage on the transistor by a screw driver and other test equipments.

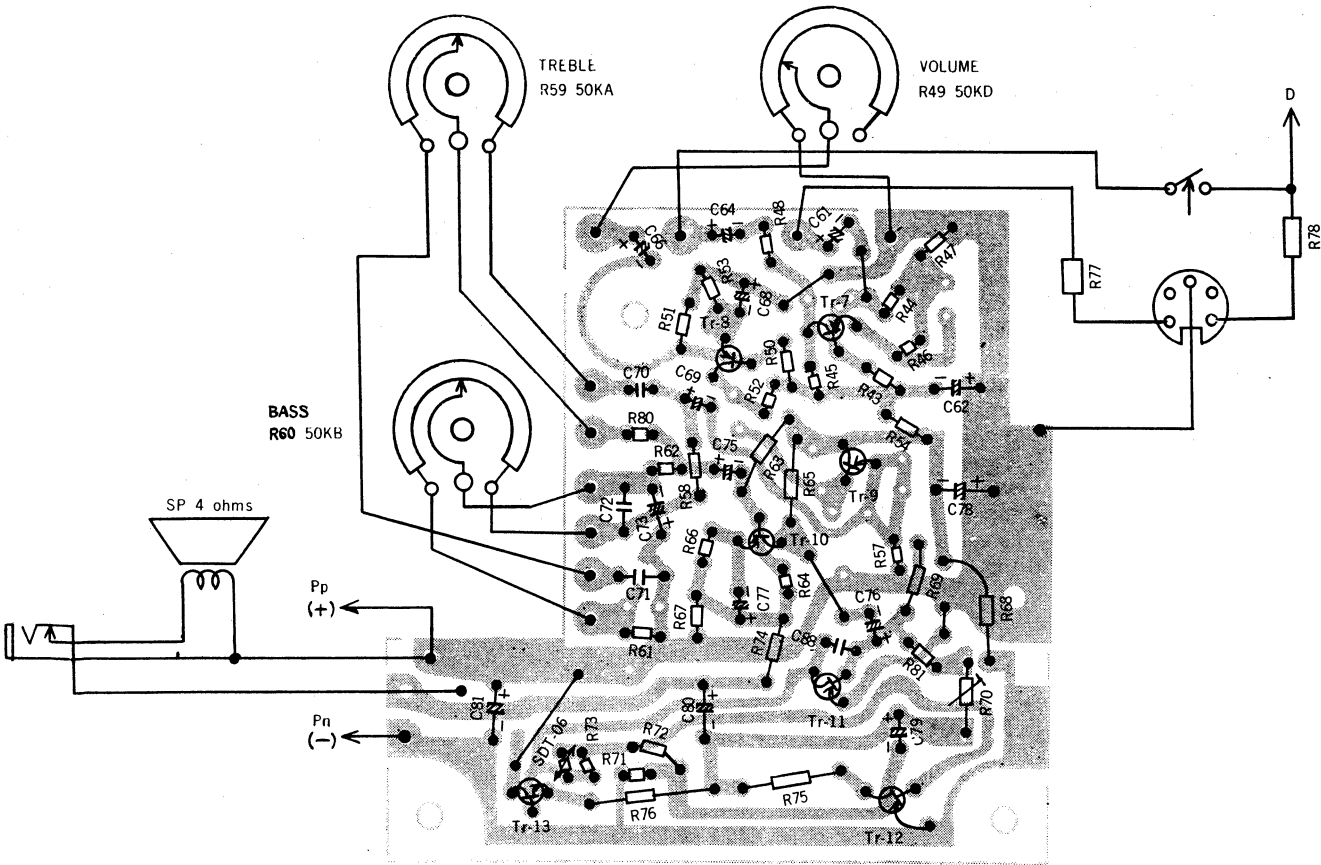


SCHEMATIC DIAGRAM (Audio Stages)



NOTE: Please be careful not to short-circuit the base of Tr11 (2N3638) to common line (negative line of battery supply) as it may lead to heavy damage on the transistor when careless shortcircuit made by a screw driver and other test equipments.

INTER-PARTS WIRING ILLUSTRATION (RF and IF Stages)



PARTS LIST

Part No.	Description	Q'ty	Part No.	Description	Q'ty
CABINET			CHASSIS		
R-A	Cabinet Assembly, model 16HA-861	1	R-S81600	Push Button, band selector	8
R-A	Front Housing Assembly, model 16HA-861	1	R-424397	Insulation Sheet, for band selector switch	1
R-32776e	Front Housing	1	R-424398	Insulation Sheet, for AFC switch	1
R-311239	Plastic Grille, speaker grille	1	R-S81591	Tuning Shaft, AM tuning	1
R-27166	Badge	1	R-S7089	Special Nut, tuning shaft mtg.	1
R-262276	Badge	1	R-S81598a	Tuner Shaft, FM tuning	1
R-38261	Dial Scale	1	R-241481	Ring, on tuner shaft	1
R-113263	Metal Mount, front & back liaison	2	R-S7085	Screw, ring mtg.	1
R-43169	Cloth, plastic grille lining	1	R-39429a	Composite Pulley	1
R-S7088	Special Screw, speaker mtg	2	R-241478	Shaft, composite pulley mtg. ISO	1
R-12059a	Speed Washer, indicator mtg	2	R-113270	Stopper Metal, composite pulley lock	1
R-261992	Eyelet, on dial scale	2	R-113271	Stopper Metal, composite pulley lock	1
R-Y	Hex/Head Screw 3 x 10,	4	R-15041	Tension Spring, dial cord stringing	1
R-Y	Hex. Nut 3φ	4	R-39430a	Drum	2
R-A	Back Housing Assembly, model 16HA-861	1	R-44308	Belt, drum driving	2
R-31904d	Back Housing	1	R-113272	Guide, drum	2
R-262004a	Marking Metal, EAR EXT SP	1	R-S7083	Special Screw, drum mtg.	1
R-261865	Marking Metal, EXT ANT	1	R-27114	Pulley	3
R-261863	Top Metal, push button identify	1	R-	Dial Cord, tetron 0.5φ 1000mm long	1
R-S81597a	World Time Zone Map	1	R-44065	Cushion, tuning capacitor mtg.	1
R-31985	Clear Plastic Disc	1	R-S7090	Special Nut, fine tuning cap. mtg.	1
R-S7077	Special Screw	2	R-44004	Cushion, pilot lamp mtg.	1
R-S3008	Lug	2	R-113352	Metal Mount, pilot lamp mtg.	1
R-472074	Specification Sheet, 16HA-861	1	R-31905	Back Ground, dial scale	1
R-A16860	Cabinet Assembly, model 16HA-860	1	R-113261	Slide Rail	1
R-A32776	Front Housing Assembly, model 16HA-860	1	R-39428f	Plastic Chassis	1
R-32776	Front Housing	1	R-39455	Holder, antenna coil mtg.	2
R-31910a	Plastic Grille, speaker grille	1	R-25317	Terminal, contact for battery compartment	2
R-27109	Sadge, SANYO Campannette	1	R-12472	Coiled Spring, terminal mtg.	2
R-38159d	Dial Scale	1	R-31986	Guide, AC input	1
R-113263	Metal Mount, front & back liaison	2	R-241507	Metal Mount, terminal mtg.	2
R-S7083	Special Screw, speaker mtg.	4	R-262047	Sleeve	1
R-12059a	Speed Washer, badge mtg.	5	R-262005	Heat Sink	1
R-A31904a	Back Housing Assembly, model 16HA-860	1	R-27108a	Stud Nut, chassis mtg.	3
R-31904d	Back Housing	1	R-41668a	Printed Circuit Board, main	1
R-262004a	Marking Metal, EAR, EXT SP & other lettering	1	R-41715a	Printed Circuit Board, AC rectifier	1
R-261865	Marking Metal, EXT. ANT lettering	1	R-41674a	Printed Circuit Board, band switch	1
R-261863a	Top Metal, push button identify	1	R-41669b	Printed Circuit Board, audio stage	1
R-S81597a	World Time Zone Map	1	R-	Ethylene Washer 12φx6φx0.5t, earphone jack	1
R-31985	Clear Plastic Disc	1	R-	Fiber Washer 10φx4.3φx1t, heat sink	2
R-S7077	Special Screw, AUTO ANT Jack mtg.	2	MISCELLANEOUS		
R-424355	Compartment, accessory	1	R-S1332	Telescopic Antenna	1
R-113384	Metal Reinforcer	1	R-S6449	Speaker, 4" x 8" 4 ohms	1
R-113385	Metal Reinforcer	1	R-S5547a	Indicator, 600 uA full scale	1
R-471658	Specification Sheet, model 16HA-860	1	R-S1331a	Ceramic Filter, SF-455D	1
R-A15860	Cabinet Assembly, model 15H-860	1	R-S6365	Earphone	1
R-A32776	Front Housing Assembly, model 15H-860	1	R-S1287	Pilot Lamp, 9V 30mA	3
R-A31904	Back Housing Assembly, model 15H-860	1	R-S81332	Jack with Switch, AC input	1
R-471569	Specification Sheet, model 15H-860	1	R-S2139	Jack, earphone	1
R-31907	Lid, battery compartment	1	R-S2179	Jack, phono & play	1
R-31908	Lid, accessory compartment	1	R-S2155	Jack, antenna	1
R-S81595	Handle	1	R-S261996	Heat Sink	1
R-241472d	Thumb Screw, handle mtg.	2	R-261866a	Heat Sink	1
R-28164	Special Washer, handle mtg.	2	R-28085	Heat Sink, 2SB492	1
R-	Polyethylene Washer 15φx10.2φx0.3t	2	R-S81599	Battery Compartment	1
R-	Vinyl Washer 15φx10.2φx1t	2	R-S3146	AC Cord	1
R-S81592	Knob, tuning control	2	R-S8575b	Plug Adaptor, England type 2 pin	1
R-S81594	Knob	4	R-S8574b	Plug Adaptor, German type 2 pin	1
R-S81593a	Pointer	1	R-S1325	Fuse Holder	1
R-424355	Compartment, accessory	1	R-S1309	Fuse, 0.2A	1
R-113384a	Metal Reinforcer	1	R-S3220	Lead & Plug, antenna	1
R-113385a	Metal Reinforcer	1	R-S3049	Lug Terminal	2
R-12473	Metal Mount, dial illumination	2	R-S3063	Terminal	2
R-113414a	Shielding Plate, for oscillator coil	1	R-S3232	Test Point	3
R-S3063	Lug	1	R-12011	Lug, lead clamp	2
			R-S3008	Lug, lead clamp	1
			R-23676	Lug, telescopic antenna	1
			R-23899	Lug, grounding of volume control	1

PARTS LIST

SCHEMATIC LOCATION	Part No.	Description
CONTROLS		
R9 R70 R49	FM-100 R-C1152	FM Tuner Assembly
	R-C1146	Variable Capacitor, AM tuning capacitor
	R-C0058a	Variable Capacitor, Fine tuning
	R-R11010	Trimmer Capacitor
	R-R124187	Semi-fixed Resistor, 50K
R59	R-R11692	Variable Resistor, 50K volume control
R60	R-R11693	Variable Resistor, 50KB treble control
Ct1 Ct2	R-C0050a	Variable Resistor, 50KA bass control
	R-S4424	Trimmer Capacitor
	R-S4425b	Push Button Switch, band selector
	R-S4426	Push Switch, pilot switch
	R-S4439	Push Switch, AFC
		Slide Switch
SEMICONDUCTORS		
Tr1	2SC645C or 2SC829C	Transistor, AM converter
Tr2	2SC772E	Transistor
Tr3 Tr4	2SC772D	Transistor
Tr5 Tr6	2SC772C	Transistor
Tr7 Tr8 Tr9 Tr10	2SB186A	Transistor
Tr11	2N3638	Transistor
Tr12	2SB405	Transistor, orange mark
Tr13	2SD72	Transistor, orange mark
Tr14	2SB492	Transistor
D1 D5 D6 D7	1S188AM	Diode
D3 D4	MA-26	Diode, silicon
D9 D10	1S188D	Diode, FM discriminator
D11	1S334	Zener Diode, 8.9 ~9.6V
	R-S1347	Silicon Rectifier, 1S1849
	SDT-06	Thermistor
RESISTORS		
R2 R30 R34 R35 R58 R69 R81	R-R562K	5.6K ohms $\pm 10\%$ $\frac{1}{4}W$
R3 R13 R45 R57 R65	R-R332K	3.3K ohms $\pm 10\%$ $\frac{1}{4}W$
R4 R41 R77	R-R563K	56K ohms $\pm 10\%$ $\frac{1}{4}W$
R5 R24	R-R561K	560 ohms $\pm 10\%$ $\frac{1}{4}W$
R6	R-R222K	2.2K ohms $\pm 10\%$ $\frac{1}{4}W$
R8 R17 R21 R22	R-R182K	1.8K ohms $\pm 10\%$ $\frac{1}{4}W$
R10 R14 R29 R48	R-R103K	10K ohms $\pm 10\%$ $\frac{1}{4}W$
R11 R16 R23 R38 R20 R39 R86	R-R221K	220 ohms $\pm 10\%$ $\frac{1}{4}W$
R12 R18 R72 R85	R-R391K	390 ohms $\pm 10\%$ $\frac{1}{4}W$
R15 R26 R54 R92	R-R101K	100 ohms $\pm 10\%$ $\frac{1}{4}W$
R19	R-R272K	2.7K ohms $\pm 10\%$ $\frac{1}{4}W$
R25 R83	R-R271K	270 ohms $\pm 10\%$ $\frac{1}{4}W$
R27 R31 R32 R36 R84 R90	R-R102K	1K ohms $\pm 10\%$ $\frac{1}{4}W$
R28 R43 R50 R78	R-R823K	82K ohms $\pm 10\%$ $\frac{1}{4}W$
R33	R-R393K	39K ohms $\pm 10\%$ $\frac{1}{4}W$
R37	R-R104K	100K ohms $\pm 10\%$ $\frac{1}{4}W$
R40	R-R270K	27 ohms $\pm 10\%$ $\frac{1}{4}W$
R42 R46 R53	R-R821K	820 ohms $\pm 10\%$ $\frac{1}{4}W$
R44 R51	R-R822K	8.2K ohms $\pm 10\%$ $\frac{1}{4}W$
R47	R-R471K	470 ohms $\pm 10\%$ $\frac{1}{4}W$
R52	R-R682K	6.8K ohms $\pm 10\%$ $\frac{1}{4}W$
R61 R80	R-R223K	22K ohms $\pm 10\%$ $\frac{1}{4}W$
R62 R64	R-R153K	15K ohms $\pm 10\%$ $\frac{1}{4}W$
R63	R-R473K	47K ohms $\pm 10\%$ $\frac{1}{4}W$
R66 R74	R-R152K	1.5K ohms $\pm 10\%$ $\frac{1}{4}W$
R67	R-R150K	15 ohms $\pm 10\%$ $\frac{1}{4}W$
R68 R71 R73	R-R820K	82 ohms $\pm 10\%$ $\frac{1}{4}W$
R75 R76	R-RON5K	0.5 ohm $\pm 10\%$ -W
R82	R-R333K	33K ohms $\pm 10\%$ $\frac{1}{4}W$
R88	R-R220K	22 ohms $\pm 10\%$ $\frac{1}{4}W$
R89	R-R180K	18 ohms $\pm 10\%$ $\frac{1}{4}W$
R91	R-R334K	330K ohms $\pm 10\%$ $\frac{1}{4}W$
R93	R-R124K	120K ohms $\pm 10\%$ $\frac{1}{4}W$
R94	R-R392K	3.9K ohms $\pm 10\%$ $\frac{1}{4}W$
R95	R-R330K	33 ohms $\pm 10\%$ $\frac{1}{4}W$

SCHEMATIC LOCATION	Part No.	Description
COILS & TRANSFORMERS		
L2	R-W1059a	Choke Coil, 1.5mH
L3 L4	R-W2353	Antenna Coil, SW4
L5 L6 L7 L8	R-W2352	Antenna Coil, SW1 SW2 SW3
L9 L10 L11 L12	R-W2351	Antenna Coil, LW MW
T1 T2 T3	R-W5T346	IF Transformer, FM
T4	R-W5T292	IF Transformer, FM
T5	R-W5T237	IF Transformer, FM
T6	R-W5T008-3	IF Transformer, AM
T7	R-W5T239	IF Transformer, AM
T8	R-W5T327-3	IF Transformer, AM
T9	R-W8264	Oscillator Coil, SW4
T10	R-W8263	Oscillator Coil, SW3
T11	R-W8262a-3	Oscillator Coil, SW2
T12	R-W8220a-3	Oscillator Coil, SW1
T13	R-W8219	Oscillator Coil, MW
T14	R-W7128	Step-down Transformer, AC power
L13	R-W9062	VHF Coil
CAPACITORS		
C1 C5 C14 C15 C25, C91 C92	R-CKS103Z	Ceramic 0.01 μ F +80% 50V
C2 C11 C12 C17 C19 C58 C102	R-CKD203Z	Ceramic 0.02 μ F +80% 50V
C3 C8 C28 C61 C75 C76 C84	R-C9882	Electrolytic 4.7 μ F 6.3V
C4 C6 C24 C59 C72 C85 C86	R-CQS203M	Mylar 0.02 μ F $\pm 20\%$ 50V
C7 C27 C44	R-CKD100K	Ceramic 10pF $\pm 10\%$ 50V
C8 C10 C16 C21 C87 C89 C90	R-CKD403Z	Ceramic 0.04 μ F +80% 50V
C9	R-CKS680J	Ceramic 68pF $\pm 5\%$ 50V
C13	R-CQS302M	Mylar 0.003 μ F $\pm 20\%$ 50V
C20 C29 C30 C35	R-CQS102M	Mylar 0.001 μ F $\pm 20\%$ 50V
C22 C88 C95	R-CKS201K	Ceramic 200pF $\pm 10\%$ 50V
C23 C62 C90	R-C9877	Electrolytic 220 μ F 10V
C26 C48	R-CKS300K	Ceramic 30pF $\pm 10\%$ 50V
C31 C32 C57 C71	R-CQS103M	Mylar 0.01 μ F $\pm 20\%$ 50V
C33	R-CQS403M	Mylar 0.04 μ F $\pm 20\%$ 50V
C34	R-CQS752M	Mylar 0.0075 μ F $\pm 20\%$ 50V
C37	R-C9881	Electrolytic 33 μ F 6.3V
C38	R-C9203	Electrolytic 1 μ F 10V
C39 C46	R-CKD200K	Ceramic 20pF $\pm 10\%$ 50V
C40 C42	R-CKS200K	Ceramic 20pF $\pm 10\%$ 50V
C45	R-CKD150K	Ceramic 15pF $\pm 10\%$ 50V
C47	R-CQT152K	Styrol 1500pF $\pm 10\%$ 35V
C49	R-CQT311K	Styrol 310pF $\pm 10\%$ 35V
C50	R-CQT162K	Styrol 165pF $\pm 10\%$ 35V
C51	R-CKD100K	Ceramic 10pF $\pm 10\%$ 50V
C52	R-CKS500J	Ceramic 50pF $\pm 5\%$ 50V
C53 C54	R-CKS501M	Ceramic 500pF $\pm 20\%$ 50V
C55 C56	R-CQS502M	Mylar 0.005 μ F $\pm 20\%$ 50V
C60 C64 C66 C73 C74	R-C9126	Electrolytic 0.1 μ F 10V
C68	R-C9134	Electrolytic 100 μ F 10V
C69	R-C9145	Electrolytic 10 μ F 10V
C70	R-CQS152M	Mylar 0.0015 μ F $\pm 20\%$ 50V
C78 C80 C81	R-C9905	Electrolytic 470 μ F 10V
C77 C79	R-C9903	Electrolytic 47 μ F 10V
C82	R-CKS800J	Ceramic 80pF $\pm 5\%$ 50V
C89	R-C9222	Electrolytic 220 μ F 25V
C101	R-CKD050J	Ceramic 5pF $\pm 0.25p$ F 50V

HOW TO ORDER REPLACEMENT PARTS

All parts listed herein may be ordered through our SERVICE DEPARTMENT of SANYO ELECTRIC TRADING CO., LTD. or Sanyo authorized service stations or agents. When ordering parts by mail parts will be shipped at prevailing prices and you will be billed accordingly.

WHEN ORDERING REPLACEMENT PARTS, ALWAYS GIVE THE FOLLOWING INFORMATION AS SHOWN IN THIS LIST:

1. The PART NUMBER.
2. The PART NAME or DESCRIPTION.
3. The MODEL NUMBER 16HA-861

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